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*"Western Treasure -- Deep, Wet Snow"*

FEDERAL-STATE COOPERATIVE  
SNOW SURVEYS AND IRRIGATION WATER FORECASTS

for

MISSOURI and ARKANSAS DRAINAGE BASINS

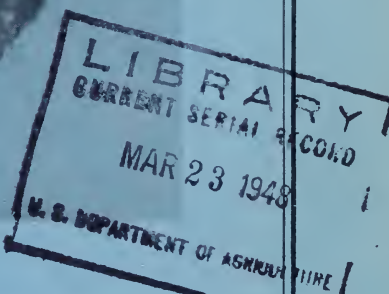
MARCH 1, 1948

By

Division of Irrigation, Soil Conservation Service  
United States Department of Agriculture  
and  
Colorado Agricultural Experiment Station

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Data included in this report were obtained by the agencies named above in cooperation with the U. S. Forest Service, National Park Service, State Engineers of Colorado, Wyoming and New Mexico and other Federal, State and local organizations.





## WATER SUPPLY OUTLOOK

### MISSOURI-ARKANSAS DRAINAGE BASINS

March 1, 1948

The water supply outlook for the Missouri River and its tributaries in Montana continues to be favorable but the pattern of snow distribution is erratic. Snow cover on the headwaters of most of these streams is under a year ago. In Wyoming the snow accumulation is about normal east of the Continental Divide. On the Bighorn River and its tributaries the snow cover is a little above average while on the North Platte it is slightly below. However, a large carryover of reservoir storage on this stream insures an excellent irrigation water supply. On the headwaters of the South Platte in Colorado the water supply prospects are very good. The irrigated area has been snow covered most of the winter and the snow water content on practically all snow courses is above average. Similar snow conditions exist on the source area of the Arkansas. Soil moisture conditions throughout the watershed are generally good.

#### MISSOURI RIVER AND TRIBUTARIES IN MONTANA

Snow cover at high elevations east of the Continental Divide in Montana is generally well above the average. A definite exception to this pattern is the Madison River that has its source in Yellowstone Park. On this watershed the snow water content is only 77 percent of normal. Northwest along the Divide the relative snow accumulation improves slightly to bring the average water content on courses on the Jefferson up to 106 percent of normal. On the Gallatin River the snow cover is unusually heavy exceeding that of a year ago. On the Missouri River, in the vicinity of Helena, snow water storage is also relatively high. In the northern section of the State, on the headwaters of the Marias River, limited snow surveys indicate a normal snow cover but only 59 percent of March 1, 1947. Recent precipitation in Central Montana has been slightly deficient, but the seasonal precipitation has been above average. Reservoir storage is practically the same as a year ago, except on the Milk River where the storage is 25 percent over last year. Snow water content measured on the headwaters of the Yellowstone is 11 percent above average and near the same as a year ago.

#### WYOMING

Shoshone: Storage in Buffalo Bill reservoir is above the past ten and 8 percent over March 1, 1947. The accumulation of snow on the headwaters of this stream is slightly better than normal but only 76 percent of a year ago. Recent precipitation at lower elevations has been at near average with snow covering most of the area the first of March. Soil moisture range and crop conditions are reported as good.

Bighorn: Snow cover on the Bighorn watershed is also above normal but substantially less than a year ago. The water supply outlook for the Bopo Agie is relatively better than for the Wind River and other tributaries. Precipitation at medium and lower elevations has been light during February but the seasonal total is above the average. Soil moisture conditions are good and stream flow slightly above normal. There was no snow on the valley floor at the end of February. Reservoir storage is about 15 percent over last year with 87,700 acre feet in Bull lake and 15,000 in Pilot Butte reservoirs.

Sweetwater: Snow conditions on this stream are above normal and slightly above March 1, 1947. Summer runoff in the Sweetwater will be about normal.

Cheyenne: Snow in the Black Hills is above average and considerably better than for the past two seasons. Soil moisture on the Belle Fourche project is described as somewhat below normal. Range and crop conditions are reported as good. Storage in Belle Fourche reservoir is 150,000 acre feet which is the same as a year ago.

Powder: No snow surveys were made on the Powder river watershed near March 1. However, earlier surveys indicate an unusually heavy snow accumulation south of the Bighorn mountains.

North Platte: Snow accumulation on the headwaters of the North Platte was about normal to March 1 and somewhat less than a year ago. The outlook for adequate water supply on this stream is excellent due to the carryover of reservoir storage from last season. Precipitation at medium and lower elevations has been high and most of the upper valley is snow covered. Stream flow is above average as far east as western Nebraska. Soil moisture is reported to be in excellent condition except near the Wyoming-Nebraska line where it is only fair. Storage in the four major reservoirs on the North Platte is now 1,364,000 acre feet as compared with 1,008,000 last year and 882,000 on March 1, 1946. In the Kingsley and Sutherland reservoirs there is now in storage 1,622,000 acre feet which is substantially above a year ago.

Laramie: Snow water content measured on the headwaters of this stream March 1 is 20 percent above normal and 8 percent over last year. Seasonal precipitation has been 100 percent above normal at Laramie. Storage in Wheatland reservoirs is near capacity.

#### SOUTH PLATTE IN COLORADO

Cache la Poudre: Snow at higher elevations on the watershed of the Poudre river is above normal and 10 percent over last year. Snow water content on the Cameron pass course is slightly below average but on lower courses it is much above. Precipitation in the valley area has been substantially above normal and the ground has been snow covered much of the winter season. Stream flow is high and soil moisture conditions are good.

Big Thompson: The water supply outlook for the Big Thompson river as of March 1 is better than for most South Platte tributaries. The average snow water content is 25 percent above normal and a year ago. Reservoir storage is over three times as great as last year at this time. The valley area is snow covered with recent precipitation about normal. Soil moisture conditions are good.

Saint Vrain: Snow conditions on the Saint Vrain watershed are similar to the Thompson river and about the same as a year ago. At the Wild Basin snow course, the water content of the snow is now 11 inches as compared to an average of 9. Precipitation in the valley area is about normal for the season. Stream flow is above average and soil moisture conditions are good.

Boulder Creek: The water supply outlook for the Boulder and South Boulder creeks is very good. Snow water content as shown by March 1 surveys is somewhat less than a year ago but above normal. Recent precipitation has been about average.

Clear Creek: Snow cover on the headwaters of this stream is slightly below normal and substantially under last year as of March 1. However, the seasonal precipitation in the valley has been above average and soil moisture conditions are excellent.

South Platte Above Denver: Storage in Denver municipal water supply reservoirs in South Park and above Denver is now 194,000 acre feet as compared with 166,000 on March 1, 1947. The water content of the snow measured at high elevation courses is 6.5 inches. A year ago it was 6.0. Precipitation has been above normal in the South Park area.

In the lower South Platte valley in Colorado, the prospects for adequate irrigation water supplies are quite favorable. In the Fort Lupton and Fort Morgan areas soil moisture conditions are very good. Storage in many of the reservoirs is near capacity, the average being near 80 percent of capacity. As of March 1, soil moisture conditions were only fair in the Sterling district but have probably improved since that time. Storage in the three principal reservoirs in this area is now 115,000 acre feet as compared with 104,000 a year ago.

#### ARKANSAS RIVER

The general outlook for irrigation water supply in the Arkansas valley is currently better than a year ago and 15 percent above normal. Precipitation throughout the valley area has been above average during the winter season. Near the mountains the plains area is snow covered. Soil moisture conditions are reported as good in all areas. The water supply outlook for the Purgatoire is especially good. Reservoir storage is substantially above March 1, 1947.

## STATUS OF RESERVOIR STORAGE, MISSOURI-ARKANSAS BASIN, MARCH 1, 1948

BASIN AND STREAM	RESERVOIR	USABLE CAPACITY (Thous. A.F.)	THOUSANDS ACRE FEET IN STORAGE ABOUT MARCH 1					10-year Avg. 1937-46
			1948	1947	1946	1945		
MISSOURI RIVER								
Missouri River	Fort Peck	19000.0	13200.0	13850.0	12890.0	10720.0	17035.0	
"	Canon Ferry	37.8	37.8	30.0	35.8	37.0	26.4	
"	Hauser Lake	52.7	45.7	49.0	51.7	51.1	42.7	
"	Holter	73.6	42.2	56.5	76.0	76.5	51.0	
"	Gibson	105.0	60.1	58.2	64.2	59.2	54.2	
"	Willow Creek	32.4	16.7	13.6	10.8	21.5	9.5	
"	Pishkun	32.0	20.8	17.2	22.7	17.2	12.9	
Marias River	Four Horns	20.0	7.3	10.4	5.5	5.3	7.5	
"	Birch Creek	30.0	19.0	28.3	20.6	22.4	16.2	
"	Lake Francis	112.0	102.3	100.6	95.4	98.4	53.0	
Musselshell River	Deadmans Basin	52.5	—	47.0	—	47.2	43.6	
"	Martinsdale	23.0	—	8.8	9.5	11.4	8.5	
Yellowstone River	Cooney	27.5	—	7.2	5.1	9.0	12.1	
Tongue River	Tongue River	73.9	9.6	7.6	—	6.3	6.6	
Milk River	Fresno	127.2	71.8	55.2	50.4	41.5	35.7	
"	Nelson	66.8	36.4	26.6	—	37.7	27.8	
St. Marys River	Sherburne	66.0	32.7	24.4	20.2	21.3	14.3	
Gallatin River	Mystic Lake	20.8	11.0	11.0	11.5	10.7	6.6	
Madison River	Madison	41.0	37.1	34.3	37.9	35.5	30.1	
"	Hebgen	345.0	283.7	267.6	209.5	217.7	201.3	
Jefferson River	Ruby	39.0	—	31.8	36.0	28.2	22.1	
Cheyenne River	Belle Fourche	198.1	149.8	149.8	133.3	123.7	82.7	
Shoshone River	Buffalo Bill	456.6	331.3	306.9	361.6	288.0	274.8	
Wind River	Pilot Butte	30.0	14.9	11.1	16.2	17.1	17.4	
"	Bull Lake	155.0	87.6	75.2	53.4	54.8	51.9	
North Platte River	Kingsley-Sutherland	2130.0	1622.0	1208.3	1185.2	780.0	424.0	
"	Minatare	60.8	21.6	18.8	19.0	19.8	20.6	
"	Alcova	190.0	109.6	83.7	36.8	17.4	42.4	
"	Seminole	1025.0	631.4	739.0	554.5	117.0	83.0	
"	Guernsey	46.0	44.5	45.0	43.2	42.2	33.1	
"	Pathfinder	1045.5	578.6	415.4	362.6	259.8	205.7	
Laramie River	Wheatland	70.4	69.8	22.7	36.5	17.3	22.2	

\*Some for shorter periods

\*Some for shorter periods

## RESERVOIR STORAGE, Cont.

BASIN AND STREAM	RESERVOIR	Usable CAPACITY (Thous. A.F.)	THOUSANDS ACRES FIRST IN STORAGE About March 1				10-year Avg.* 1937-46
			1948	1947	1946	1945	
MISSOURI RIVER	Windsor	15.6	12.5	9.4	11.7	6.0	9.0
	Cache la Poudre	9.5	9.2	5.9	8.3	3.1	6.2
	Fossil Creek	11.6	10.1	8.1	7.3	2.2	5.9
	Terry Lake	8.2	4.4	4.1	4.0	4.1	4.4
	Halligan	6.4	0	3.6	0.0	0.0	1.8
	Chamber's Lake	8.8	2.7	2.6	2.0	1.5	2.5
	Cobb Lake	34.3	5.4	0.4	4.4	8.7	3.7
	Black Hollow	8.0	4.3	4.8	4.1	2.2	2.8
	Lake Loveland	14.3	6.5	0.0	8.0	3.6	4.1
	Boyd Lake	44.0	30.1	4.8	24.8	26.0	12.3
	Lone Tree	9.2	8.0	7.5	3.5	2.3	4.8
	Mariano	5.4	4.0	1.7	2.9	1.5	2.2
	Union	12.7	10.6	5.5	9.2	5.5	6.2
	Barker Meadow	11.7	---	0	0.6	---	3.8
	Eleven Mile	81.5	81.9	81.9	81.9	81.9	66.4
	Cheeseman	79.0	77.3	48.0	73.2	58.4	48.1
South Platte River	Marston	18.9	14.0	16.0	16.5	16.2	15.7
	Barr Lake	32.2	25.9	25.4	25.5	17.4	16.8
	Milton	24.4	17.1	18.8	15.1	7.7	7.8
	Standley	18.5	14.6	8.8	16.3	9.5	11.2
	Marshall	10.3	2.6	2.3	4.7	1.5	2.6
	Antero	33.0	21.0	20.0	20.1	12.6	9.7
	Horse Creek	20.6	14.7	13.5	12.8	7.7	6.3
	Riverside	57.5	53.9	55.4	53.9	38.3	39.4
	Empire	37.7	30.4	32.1	29.9	26.3	25.7
	Jackson Lake	35.4	31.2	30.0	31.7	31.2	31.5
	Prewitt	32.8	26.9	28.1	28.4	15.4	17.4
	Point of Rocks	70.0	67.8	55.1	67.9	51.5	48.2
	Julesburg	28.2	20.3	20.7	20.3	20.3	20.4

\*Some for shorter periods

## RESERVOIR STORAGE, Cont.

BASIN AND STREAM	RESERVOIR	USABLE CAPACITY (Thous. A. F.)	THOUSANDS ACRE FEET IN STORAGE About March 1				
			1948	1947	1946	1945	10-year avg. 1937-46*
ARKANSAS RIVER	Twin Lakes	57.9	37.5	21.2	40.1	16.5	25.6
Arkansas River	Sugar Loaf	17.4	10.6	7.7	12.8	6.5	8.0
"	Clear Creek	11.4	9.4	4.0	8.8	7.9	4.4
"	Meredith	41.9	32.6	27.0	26.1	37.4	17.6
"	Horse Creek	26.9	16.8	17.2	18.1	16.1	8.8
"	Adobe Creek	61.6	55.0	31.6	49.1	36.0	24.0
"	Cucharas	40.0	18.4	2.3	5.5	11.8	8.0
"	Two Buttes	40.9	—	7.9	0.3	1.0	13.1
"	John Martin	655.0	59.6	53.8	50.4	49.0	40.0
"	Great Plains	150.0	111.3	71.7	122.7	113.5	35.6
Purgatoire River	Model	15.0	3.5	2.6	2.2	4.0	4.8

\*Some for shorter periods.

SNOW SURVEYS AND IRRIGATION WATER FORECASTS  
FOR MISSOURI AND ARKANSAS RIVERS

March 1, 1948

## P R E C I P I T A T I O N   D A T A

WATERSHED	STATE	Precipitation October 1 to February 29*	Departure from Normal	Precipitation February	Departure from Normal
		Inches	Inches	Inches	Inches
Missouri	East. Mont.	2.29	-0.59	0.50	+0.06
Missouri	Cent. Mont.	3.84	+0.11	0.49	-0.11
Missouri	North. Wyo.	6.30	+1.56	1.03	+0.03
North Platte	Wyoming	4.78	+0.58	1.12	+0.22
South Platte	Colorado	7.88	+2.96	1.15	+0.15
Arkansas	Colorado	7.52	+2.92	1.92	+0.87

February precipitation was above normal except in central Montana. Seasonal precipitation is above normal except eastern Montana.

\*February precipitation tentative

SUMMARY OF MARCH 1 SNOW SURVEYS AND COMPARISON OF DATA  
WITH THAT OF PREVIOUS YEARS BY WATERSHEDS

WATERSHEDS	Snow Depth		Water Content		Number Courses in Average	Snow Density		1947 Water Content in percent of Thirteen year avg. *
	Thirteen Year Avg. *	1947	Thirteen Year Avg. *	1948		Thirteen year Avg. *	1948	
	In.	In.	In.	In.		Percent	Percent	
MISSOURI RIVER								
Jefferson River	26.8	32.4	7.0	9.6	8	26	25	106
Madison River	55.4	61.6	17.3	20.7	6	31	28	77
Gallatin River	34.3	37.7	9.2	10.0	7	27	29	151
Misselshell River	18.6	26.2	4.0	5.6	2	21	21	127
Missouri River**	29.3	39.1	7.3	10.3	11	25	27	135
Marias River	45.1	63.4	13.9	23.3	1	31	27	99
Yellowstone River	30.6	32.7	7.2	8.3	3	23	24	111
Milk River	18.6	18.3	4.8	5.7	1	26	29	135
Shoshone River	50.7	62.8	14.6	20.7	2	29	29	108
Bighorn River	30.7	37.3	8.0	10.2	7	26	26	107
Powder River								
North Platte River	49.7	60.2	14.2	15.7	10	29	26	97
Sweetwater River	35.6	38.8	9.2	10.1	2	26	29	113
Laramie River	34.3	41.2	9.0	10.0	8	26	27	120
Cheyenne River	20.8	17.3	4.4	3.7	3	21	21	113
South Platte River***	22.7	33.1	4.8	6.0	3	21	20	135
Crow Creek	17.2	20.7	3.9	5.1	1	22	27	172
Poudre River	36.3	46.5	9.8	10.3	5	27	26	115
Big Thompson River	46.7	56.8	12.0	11.8	2	26	25	124
St. Vrain River	37.1	50.2	9.1	11.3	1	25	23	122
Boulder Creek	31.0	45.4	9.3	13.0	2	30	24	111
Clear Creek	43.0	55.7	11.5	13.8	2	27	25	97
ARKANSAS RIVER	35.5	41.9	8.6	8.7	7	24	24	115

\*Some for shorter periods. \*\*Between Helena and Great Falls. \*\*\*Above Denver, Colo.

## MISSOURI-ARKANSAS RIVERS SNOW SURVEYS, March 1, 1948

DRAINAGE BASIN and SNOW COURSE		LOCATION			SNOW COURSE MEASUREMENTS									
		No. and State	Sec.	Two.	Range	Elev.	Date of Survey	Snow Depth (Inches)	Water Content (Inches)		Years of Record	Past Record Av. Water Content (Inches)		
JEFFERSON RIVER														
6 Ida	21	13N	36E	6800	2/28	21.0	4.1	9.6	1948	13	7.6			
7 "	27	27N	21E	6200	2/29	53.0	15.3	19.2	1947	10	12.7			
10 Mont.	4	2S	19W	7100	3/1	66.8	19.8	25.5	1946	13	18.5			
30 "	11	1N	7W	7200	2/27	27.0	5.0	5.7	1947	11	4.0			
"	15	4S	12W	8450	3/2	35.2	8.4	11.0	1946	13	7.4			
"	22	5N	6W	6500	3/1	23.3	5.3	3.9	1947	4	3.4			
"	8	13S	9W	6100	3/2	0.0	0.0	0.0	1947	4	0.1			
"	11	1N	12W	5700	3/2	6.5	1.3	7.0	1946	3	2.4			
Average for Drainage							29.1	9.6	8.6	7.0				
MADISON RIVER														
2 Wyo.		44.3N	110.6W	7700	2/18	54.0	15.8	29.6	1947	13	22.6			
8 "		44.2N	110.7W	7900	2/18	63.0	23.5	39.1	1946	13	30.8			
11 "		44.3N	110.7W	7500				8.9	1947	10				
3 Ida.	34	14N	44E	6500	2/26	48.0	13.2	17.5	1947	13	16.7			
16 Mont.	34	13S	5E	6700	3/2	32.3	6.9	10.3	1946	13	9.7			
"	1	11S	5E	7150	3/2	43.1	10.5	16.1	1948	13	13.0			
"	22	11S	3E	6550	3/1	38.5	10.1	11.5	1946	13	11.2			
Average for Drainage							47.3	20.7	20.5	17.3				
GALLATIN RIVER														
Mont.	14	5S	6E	8100	3/3	71.4	23.3	16.0	1947	12	14.9			
"	22	4S	6E	6600	3/3	41.8	11.3	6.2	1946	11	6.7			
"	31	3S	7E	6600	3/1	40.6	12.1	8.1	1947	12	6.8			
"	31	3S	7E	6600	3/1	41.1	11.5	7.3	1946	12	6.0			
"	1	11S	5E	7150	3/2	43.1	10.5	16.1	1948	13	13.0			
"	10	1N	6E	7000	3/1	48.1	14.0	5.4	1946	9	8.1			
"	13	3S	6E	7000	3/1	48.8	14.7	10.7	1947	7	8.8			
Average for Drainage							47.8	10.0	10.9	9.2				
MUSSEL SHELL RIVER														
Mont.	19	9N	8E	7000	2/25	24.5	5.1	5.2	1947	10	3.9			
"	31	10N	9E	6500	2/25	23.4	5.1	6.0	1946	10	4.0			
Average for Drainage							24.0	5.6	3.4	4.0				
*Adjacent Drainage														

\*Adjacent Drainage

MISSOURI-ARKANSAS RIVER'S SNOW SURVEYS, March 1, 1948

LOCATION		SNOW COURSE MEASUREMENTS									
No. and State	Sec.	Typ.	Range	Elev.	Date of Survey	Snow Depth (Inches)	Water Content (Inches)			Years of Record	Past Record Av. Water Content (Inches)
							1946	1947	1948		
MISSOURI RIVER											
6 Mont.	2	8N	6W	6200	3/3	28.6	8.4	6.0	3.0	13	4.2
11 "		45.5N	112.9W	7000	3/3	38.0	9.8	16.1	8.4	13	7.8
36 "	16	13N	7W	6900	3/2	35.2	8.5	12.0	8.2	13	7.8
41 "	13	8N	6W	6250	3/1	33.2	9.0	9.1	4.9	13	5.6
42 "	13	8N	6W	6800	3/1	45.3	12.4	13.0	7.7	13	8.1
43 "	19	8N	5W	8000	3/1	51.3	15.7	16.3	10.3	13	10.3
27 "	19	9N	8E	7000	2/25	24.5	5.1	5.2	3.7	10	3.9
25 "	35	13N	7E	7950	3/1	47.3	12.0	13.0	15.8	13	10.7
26 "	31	10N	9E	6500	2/25	23.4	5.1	6.0	3.2	10	4.0
23 "	22	12N	18E	6000	3/2	30.6	8.8	6.7	6.5	8	6.7
24 "	24	12N	17E	5500	3/2	48.7	14.4	9.7	11.5	7	10.7
		Average for drainage				36.9	9.9	10.3	7.6		7.3
20 Mont.		48.3N	113.4W	5250	3/3	51.0	13.7	23.3	15.8	13	13.9
YELLOWSTONE RIVER											
40 Wyo.		44.9N	110.6W	7300				8.1		9	
41 "		44.9N	110.6W	7500				10.0		8	
11 Mont.	2	8S	18E	7870	2/29	38.0	9.3		4.7	10	
2 Wyo.		44.7N	110.5W	7750	3/2	40.6	9.5	11.4	10.3	11	5.0
10 Mont.	25	9S	14E	7400	2/29	35.6	8.2		6.4	11	6.2
5 "	26	9S	9E	8400				8.8	8.5	10	
6 "	26	9S	9E	8300				9.5	7.7	10	
7 Wyo.		44.6N	110.4W	7850	3/2	38.8	9.2		8.5	12	8.6
7 Mont.	10	4N	10E	6500	3/1	19.5	5.2	9.5	4.8	10	3.9
8 "	23	5S	12E	6000				4.1		7	
9 "	22	7S	12E	8000	3/6	58.6	18.7	4.1		6	13.4
		Average for drainage				33.0	8.0	8.3	7.9		7.2
22 Mont.	15	82N	16E		3/1	22.1	6.5	5.7	5.5	8	4.8
MILK RIVER											
Rocky Boy											

\*Adjacent Drainage. \*\* Between Helena and Great Falls

## MISSOURI ARKANSAS RIVERS SNOW SURVEYS, March 1, 1948

DRAINAGE BASIN and SNOW COURSE	LOCATION			SNOW COURSE MEASUREMENTS						
	No. and State	Sec.	Twp.	Range	Elev.	Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Years of Record	Past Record Av. Water Content (Inches)
MISSOURI RIVER										
SHOSHONE RIVER										
Sylvan Pass	32 Wyo.	12	52N	110W	7100	2/28	47.7	12.6	6	12.2
Brooks Lake #3*	50 "	23	44N	110W	9200	2/28	61.8	19.1	12	17.0
				Average for drainage			54.8	15.8		14.6
BIG HORN RIVER										
Togwotee Pass	12 Wyo.	29	44N	110W	9600			28.4	3	
Sawmill Glade	45 "	3	31N	101W	8500	2/27	22.2	3.7	8	4.5
Blue Ridge	46 "	23	31N	101W	9500	2/27	32.0	9.3	9	7.6
South Pass	47 "	13	30N	101W	9000	2/26	33.2	9.2	9	9.2
Sheridan Cr. R. S.	49 "	3	42N	109W	7500	2/28	29.4	6.3	12	5.1
Brooks Lake #3	50 "	23	44N	110W	9200	2/28	61.8	19.1	12	17.0
St. Lawrence R. S.	51 "	26	1N	4W	9000			4.9	12	
Mosquito Park R. S.	52 "	23	2S	3W	9500			6.0		
DuNoir	53 "	27	42N	108W	8750	2/27	24.2	5.6	8	7.2
T-Cross Ranch	54 "	1	43N	107W	8000	2/27	22.8	4.9	8	5.5
				Average for drainage			32.2	8.6		8.0
POWDER RIVER										
Red Fork	30 Wyo.	18	43N	83W	7500			7.5	8	
SWEETWATER RIVER										
Grainnier Meadows	29 Wyo.	19	30N	100W	9000	2/26	37.6	11.5	12	9.2
South Pass*	47 "	13	30N	101W	9000	2/26	33.2	9.2	9	9.2
				Average for drainage			35.4	10.4		9.2
CHEYENNE RIVER										
Upper Spearfish	1 S. Dak	21	3N	1E	6500	2/28	28.6	6.0	5	5.2
Upper Castle	2 "	24	2N	1E	6800	2/27	26.2	5.6	5	4.7
Deerfield	3 "	23	1N	2E	6000	3/1	17.1	3.5	5	3.2
				Average for drainage			24.0	5.0		4.4

\*On adjacent drainage

## MISSOURI-ARKANSAS RIVERS SNOW SURVEYS, March 1, 1948

DRAINAGE BASIN and SNOW COURSE			LOCATION			SNOW COURSE MEASUREMENTS				
No. and State	Sec.	Twp.	Range	Elev.	Date of Survey	Snow Depth (Inches)	Water Content (Inches)		Years of Record	Past Record Av. Water Content (Inches)
MISSOURI RIVER										
NORTH PLATTE RIVER										
Cameron Pass.	2	6N	76W	10300	2/28	50.6	15.4	17.9	18.6	15.7
Park View	24	5N	78W	9200	3/2	35.3	7.1	9.1	6.1	7.2
Columbine Lodge	21	5N	82W	9300	3/1	72.9	18.0	17.8	20.9	17.8
Willow Cr. Pass*	1	4N	78W	9500	3/2	46.3	10.0	12.0	8.4	9.2
Bottle Creek	24	14N	85W	8200	3/28	36.3	9.1	10.2	8.8	9.9
Webber Creek	27	14N	85W	9000	2/29	49.6	13.4	15.4	11.8	12.9
Old Battle	29	14N	85W	9800	2/28	72.1	22.9	32.7	21.3	24.1
N. French Creek	27	16N	80W	10200	2/29	69.0	20.4	21.0	23.9	22.4
N. Barrett Creek #2	30	16N	80W	9400	2/29	52.9	13.4	14.2	13.9	14.2
Ryan Park #2	34	16N	81W	8400	2/25	36.3	8.2	7.3	7.0	8.1
		Average for drainage				52.1	13.8	15.7	14.0	14.2
LARAMIE RIVER										
Brooklyn Lake	11	16N	79W	10200	2/28	55.1	16.6	15.8	16.3	16.1
Fox Park	21	13N	78W	9200	2/26	36.5	9.2	6.7	6.2	7.1
Pole Mtn. #2*	35	15N	72W	8700	2/28	24.7	6.7	5.1	2.4	3.9
Libby Lodge #2	29	16N	78W	8700	2/28	35.5	9.1	6.6	7.1	6.9
Hairoin Turn #2	24	16N	79W	9500	2/28	37.2	9.4	8.2	7.8	7.7
W. Port. G-P Tun.	7	8N	75W	8600	2/29	33.8	8.4	6.9	6.3	6.7
Deadman Hill*	26	10N	75W	10200	2/26	41.7	10.6	12.4	11.5	10.1
Roach	5	10N	77W	9800	2/28	57.5	16.4	18.5	14.1	13.8
		Average for drainage				40.2	10.8	10.0	9.0	9.0
CROW CREEK										
Pole Mtn. #2	35	15N	72W	8700	2/28	24.7	6.7	5.1	2.4	3.9
POUDRE RIVER										
Cameron Pass	2	6N	76W	10300	2/28	50.6	15.4	17.9	18.6	15.7
Chambers Lake	6	7N	75W	9000	2/29	34.2	8.0	6.0	5.8	5.6
Big South	33	8N	75W	8600	2/29	18.0	3.3	2.1	1.6	2.0
Deadman Hill	26	10N	75W	10200	2/26	41.7	10.6	12.4	11.5	10.1
Lake Irene*	8	5N	75W	10600	2/29	70.1	19.5	13.4	17.7	15.7
Hour Glass Lake	18	7N	73W	9500	2/28	27.4	6.6	--	5.4	5.1
		Average for drainage				42.9	11.3	10.3	11.0	9.8
*On adjacent drainage										

\*On adjacent drainage

MISSOURI-ARKANSAS RIVERS SNOW SURVEYS, March 1, 1948

DRAINAGE BASIN and SNOW COURSE		LOCATION			SNOW COURSE MEASUREMENTS								
		No. and State	Sec.	Two.	Range	Elev.	Date of Survey	Snow Depth (Inches)	Water Content (Inches)		Years of Record	Past Record Av. Water Content (Inches)	
MISSOURI RIVER													
BIG THOMPSON RIVER													
Lake Irene*	65 Colo.	8	5N	75W	10600	2/29	70.1	19.5	13.4	17.7	11	15.7	
Hidden Valley #2	95 "	23	5N	74W	9550	3/1	50.1	10.3	10.3	6.6	8	8.2	
				Average for drainage			60.1	14.9	11.8	12.2		12.0	
ST. VRAIN RIVER													
Wild Basin	41 Colo.	24	3N	74W	10000	3/2	46.2	11.1	11.3	8.9	12	9.1	
BOULDER CREEK													
E. Port. Moffat T.	5 Colo.	2	2S	74W	9400	3/2	19.4	5.1	6.8	1.8	12	3.2	
University Camp #2	60 "	28	1N	73W	10300	2/26	53.4	15.5	19.3	20.2	11	15.5	
				Average for drainage			36.4	10.3	13.0	11.0		9.3	
CLEAR CREEK													
Loveland Pass #2	61 Colo.	37	4S	76W	10100	2/28	42.7	9.9	12.6	12.3	12	9.9	
Grizzly Peak*	97 "	2	5S	76W	11250	2/25	46.5	12.5	14.0	14.8	7	13.1	
				Average for drainage			44.6	11.2	13.8	13.6		11.5	
SOUTH PLATTE RIVER	(Above Denver)												
Hosier Pass	14 Colo.	13	8S	73W	11400	2/27	42.9	9.2	7.8	9.2	12	8.2	
Fairplay	15 "	33	9S	77W	10000	2/28	18.7	3.0	1.6	T	11	0.7	
Jefferson Cr. #2	83 "	14	7S	76W	10100	2/27	38.3	7.2	8.6	7.4	10	5.4	
				Average for drainage			33.1	6.5	6.0	5.5		4.8	
ARKANSAS RIVER													
Tennessee Pass	19 Colo.	21	8S	80W	10200	2/26	36.0	7.7	8.1	6.0	13	7.3	
Twin Lakes T.	21 "	22	11S	82W	10500				9.1	1.1	11		
Marshall Cr. *	42 "	24	48N	6E	10800	2/29	43.7	9.6	8.5	6.4	13	9.7	
Poncha Cr.	43 "	19	48N	7E	10500	2/29	34.0	9.2	6.0	4.5	13	8.0	
Whiskey Cr. #2	72 "		37.2N	105.2W	10300				4.7	2.8	11		
Ia Veta Pass #2*	74 "	22	28S	70W	9300	2/27	39.6	10.8	8.0	4.6	11	7.3	
Four Mile Park #2	78 "	23	11S	81W	9700	2/27	21.9	3.7	4.5	1.7	10	2.9	
Fremont Pass #2*	79 "	2	8S	79W	11400	2/25	53.8	13.6	13.4	13.3	13	12.0	
Monarch Pass	92 "	16	49N	6E	10500	3/2	61.4	14.8	12.7		7	13.0	
Glen Cove	103 "	26	13S	69W	10800	2/27	31.8	7.8			1		
				Average for drainage			41.5	9.9	8.7	6.1		8.6	

On adjacent drainage

\*On adjacent drainage

The following organizations cooperate in the snow surveys and irrigation water supply forecasts for the Colorado, Missouri-Arkansas and Rio Grande watersheds by furnishing funds or services.

#### STATE

- Colorado State Engineer
- Wyoming State Engineer
- Utah State Engineer
- New Mexico State Engineer
- Montana State Engineer
- Nebraska State Engineer
- Colorado Experiment Station
- Colorado Extension Service
- Montana Experiment Station
- Utah Experiment Station

#### FEDERAL

- Department of Agriculture
  - Forest Service
  - Soil Conservation Service
- Department of Interior
  - Bureau of Reclamation
  - Geological Survey
  - National Park Service
- Department of Commerce
  - Weather Bureau
- War Department
  - Army Engineer Corps

#### PUBLIC UTILITIES

- Colorado Public Service Company
- Western Colorado Power Company
- Montana Power Company
- Public Service Company of New Mexico
- Denver and Rio Grande Western R. R. Company

#### MUNICIPALITIES

- City of Bozeman
- City of Denver
- City of Boulder

#### WATER USERS ORGANIZATIONS

- Poudre Valley Water Users' Association
- Arkansas Valley Ditch Association
- Colorado River Water Conservation District

#### IRRIGATION PROJECTS

- Farmers Reservoir and Irrigation Company
- San Luis Valley Irrigation District
- Santa Maria Reservoir Company
- Costilla Land Company
- Uncompahgre Valley Water Users' Association
- Wyoming Development Company
- Goshen Irrigation District
- Kendrick Project
- Pathfinder Irrigation District
- Salt River Valley Water Users' Association
- San Carlos Irrigation and Drainage District
- Twin Lakes Reservoir and Canal Company

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